Learning Theories Assignment by Stefan Burella

I believe that it is imperative that students have a solid foundation of fundamental concepts to build upon, especially when it comes to learning mathematics. Once students have developed this foundation, it is then up to the teacher to foster a learning environment that encourages curiosity and wonder, which will serve to motivate students to further their learning. The teacher should act as a guide, challenging students to critically think and solve progressively difficult problems while showing them multiple ways to approach problem solving.

The following four learning theories best describe the way that I believe students should be taught in order to maximize their learning and learning potential. You will found a brief description of each theory and why I think it is relevant:

Theory	Description	Usefulness in Mathematics Education
ARCS Model of Motivational Design (Keller)	The ARCS model of motivational design was created by John Keller as a way of categorizing how students are motivated to learn. The model is built upon four main factors which promote motivation. *Attention:* Various attention-grabbing activities or stimuli are used to begin the motivation process. If a topic cannot grab a student's attention then they will be unaware of the topic, which makes learning impossible. Some ways in which attention can be attained are: surprise, humour, questioning, active participation, and other visual and auditory stimuli. *Relevance:* This goes hand in hand with attention. If a student can be shown how a topic is relevant to their life, they will be motivated to learn more about that topic, as it can have positive (or negative) implications on their daily lives. This can be done by providing concrete examples and by explaining where and when the topic at hand will be used. *Confidence:* Confidence is essential to learning as a student who has low confidence in a subject material will be discouraged and will not want to put in the effort required to succeed. In order for students to be motivated to learn they must feel confident in their ability to tackle	In terms of student motivation, mathematics far and away presents the greatest challenge for a teacher. Students come into a math course with a preconceived notion of impossible difficulty, which belies their lack of confidence in the subject. A teacher who is aware of these deficits can make great strides towards correcting this problem. A teacher should be able to gain students attention by designing fun lessons; lessons that utilize multimedia and manipulatives rather than the tired archaic formula of lecturing. Teachers should also design their lessons to be as relevant to reality as possible. Students won't care what the use of pi is when merely shown the number and told it's definition, but show them that its used everywhere from rocket design to mapping the movements of subatomic particles and their curiosity will be engaged. Perhaps most importantly is a teacher's ability to build confidence in their students. A student with high confidence in a subject will be motivated to continue to learn, as well as prove his/her ability. And last but not least students need to

	any difficulties that may arise from the learning experience. *Satisfaction:* If learning results in satisfaction, or some kind of reward, then they will be motivated to continue learning. This makes the student feel valued and useful. Satisfaction can be had by giving students positive feedback and praise, even if they are not entirely successful in their endeavor.	gain satisfaction from learning in order to continue being motivated to learn. If a teacher doesn't provide satisfaction, even something as simple as praise, then students will no impetus to continue learning.
Experiential Learning (Kolb)	Building upon prior work by Dewey and Levin, Kolb believed that learning is achieved when knowledge is created through experience. In order for students to learn they must be able to experience what are they are trying to learn. This theory has four steps in a cyclical pathway that make up the process of learning through experience. First there is the actual *concrete experience*, whereby the learner is actively doing the learning activity. Then follows *reflective observation*, where the learner reflects on what they observed during the activity. This is followed by *abstract conceptualization* and *active experimentation*, in which the learner thinks about what they did/are going to do and then plans a course of action to achieve that goal. This completes the learning pathway.	I believe that experiential learning is essential in order for students to maximize their potential. While I do think some students benefit from this more than others, I have firsthand seen that all students need to experience learning firsthand. It allows difficult concepts to be understood through kinesthetic and visual pathways. Nowhere is this more important or difficult to implement than in mathematics. As math is a very abstract subject it is important for teachers to have students experience a concept. For instance when learning about circles and pi and the relationship between circumference and diameter, have the students create different sized circles from paper, measure their circumferences and diameters, and analyze the ratios of c/d, which will give a rough approximation of pi. This allows students to learn a concept in different ways, which is the key to building knowledge that can be retained.
Problem Based Learning	Problem based learning, or PBL, is a learning theory that posits that students learn best when they are given challenging and open-ended questions. Students are self-directed to solve problems by using past experiences and knowledge. Teachers function as facilitators in this system, rather than the absolute holders of knowledge. This encourages growth of a student's creative and problem-solving abilities, and can also serve to increase student motivation, as the problems are challenging and	Problem based learning is ideal for mathematics instruction. By asking students to essentially formulate their own way to solve a challenging problem, you get students to build their own knowledge through self-direction. As a teacher you are merely there to guide them, as the process of self-learning is the key to understanding.

	open-ended.	
Schema Theory	According to proponents of schema theory, students understand and process new experiences and learning by relating them to pre-established mental representations, or *schemata*, in their memory. Any new experience or knowledge is processed and sorted in schemata based on where the brain believes it fits in. Any information that does not fit may be interpreted as misplaced or misunderstood. Schemata can be thought of as bookshelves, new "material" is sorted and placed into the appropriate bookshelf based on how it relates to previous information stored in the schemata.	Schema theory is interesting a mathematical teaching theory in the fact that it should be common knowledge and common sense but is seldom utilized in the classroom. Most math teachers teach the required curriculum in the (limited) time they have to teach it. This often leads to many students getting "left behind" and lost due to a lack of understanding. If math teachers took the time to ensure that all students had the required fundamental knowledge, and then taught in a way that sequentially built upon that prior knowledge, then they could ensure that all students processed the knowledge into the appropriate schemata, allowing for easy recall and further growth.